

Sports Betting Legalization Amplifies Emotional Cues and Intimate Partner Violence

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Overview of Paper

Does the legalization of **sports betting amplify** emotional cues & IPV instances?

Our setting: National Football League (NFL)

- Same as Card & Dahl (2011)
- Most viewed sports in the U.S.
 - ▶ ~ 18 mil TV viewers on average
- Most bet sports in the U.S.
 - ▶ ~ 81% of bettors placed a bet on NFL
 - ▶ ~ \$22mil wagered per regular season NFL game
- Easiest sports for identification/finding counterfactuals

Question: Does the effect of upset loss by a favorite team become larger when sports betting is legal?

Overview of Paper

We...

- Are the **first** to study causal relationship
 - ▶ Some descriptive papers about gambling & IPV, but none about gambling legalization & IPV
- Find **larger effects (↑ 10 p.p.)** of upset loss by a fav team on IPV instances when sports betting is legalized
- Find that this translates into an increase of 16.6 to 31.3 additional IPV instances during the 2022 season
- Conduct heterogeneity analysis to reveal that **financial loss** is a key mechanism
 - ▶ ↑ attachment also may be a channel, but cannot test it

Some Causes of IPV?

Economic shocks including...

- Great recession (Schneider et al 2016)
- Stock market losses (Lin and Pursiainen 2023)
- Male-female wage gap (Aizer 2010; Henke & Hsu 2020)

Emotional cues stemming from...

- Traffic (Beland and Brent 2018)
- Election Outcome (Collins 2022)
- Sports Upsets (Card and Dahl 2011, Cardazzi et al 2022)

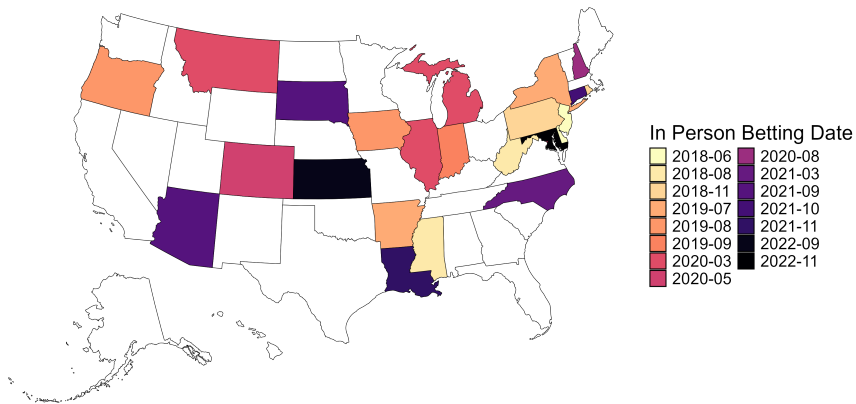
Summary of Card & Dahl (2011)

Examine the effect of **unexpected NFL game outcomes** on IPV

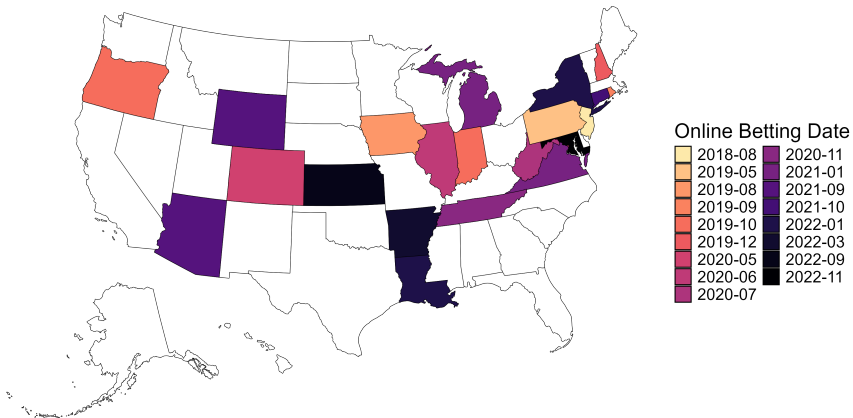
Find **upset loss** ↑ **IPV instances by 10%**

No effect on upset wins or close loss

In-Person Sports Betting Legalization



Online Sports Betting Legalization



Basics of Sports Gambling: Spread

Spread: Difference btwn **expected score** from other team vs. your team

- Higher spread \Rightarrow Higher score difference
- Negative \Rightarrow Expected to win
- Positive \Rightarrow Expected to lose

1:25PM				
 LA Rams	+5.5	-110	O 46.5	-110
				+200
 SEA Seahawks	-5.5	-110	U 46.5	-110
				-240

Use **spread to proxy** the likelihood of a team winning

- Spread is **unbiased** predictor for team's success (Gandar et al. 1988; Pankoff 1968)

Measuring NFL Outcomes

Final spread from **NFLOddsHistory.com**

- Spread $\leq -4 \Rightarrow$ Favored to Win
- Spread $\in (-4, 4) \Rightarrow$ Close Game
- Spread $\geq 4 \Rightarrow$ Favored to Lose

Final Score from **ESPN.com**

- Favored to Win * Lose \Rightarrow Upset Loss
- Close Game * Lose \Rightarrow Close loss
- Favored to Lose * Win \Rightarrow Upset Win

Crime Data: NIBRS

Crime data from the 2011-2022 **National Incident Based Reporting System**

- Reported from ~8,500 police agencies covering ~ 146 million people
- **Detailed** incident level data
- Information on victim & offender demographics, time of the day, & location of offense
- Can measure incident (i.e. police getting called, but not resulting in an arrest)

Agency-by-day panel of total **male-to-female IPV** incidents occurring **at home between 12 to 11:59pm** on Sunday

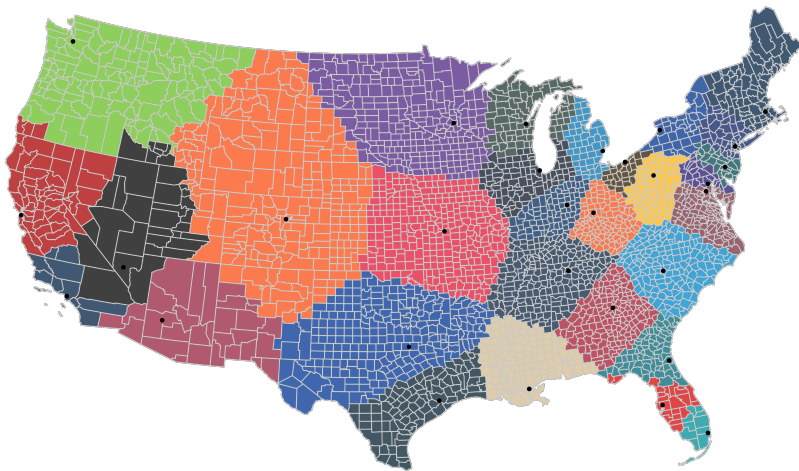
Mapping Crime Data to NFL Data

How do we map crime data (agency/county) w/ NFL teams (team)?

Define Home Team based on the **closest team** in linear distance

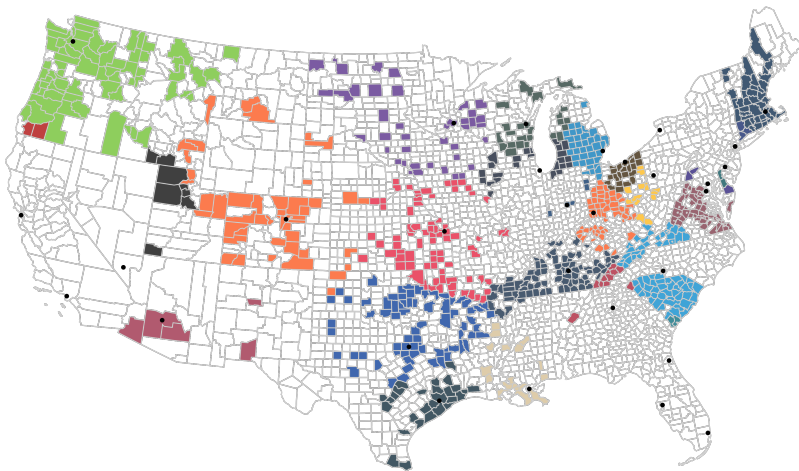
- Ex. Eugene OR \Rightarrow Seattle Seahawks

Closest NFL Team: 2021



- | | | | | |
|-------------------|--------------------|----------------------|----------------------|--------------------------|
| Arizona Cardinals | Cincinnati Bengals | Houston Texans | Miami Dolphins | Pittsburgh Steelers |
| Atlanta Falcons | Cleveland Browns | Indianapolis Colts | Minnesota Vikings | San Francisco 49ers |
| Baltimore Ravens | Dallas Cowboys | Jacksonville Jaguars | New England Patriots | Seattle Seahawks |
| Buffalo Bills | Denver Broncos | Kansas City Chiefs | New Orleans Saints | Tampa Bay Buccaneers |
| Carolina Panthers | Detroit Lions | Las Vegas Raiders | New York Giants | Tennessee Titans |
| Chicago Bears | Green Bay Packers | Los Angeles Rams | Philadelphia Eagles | Washington Football Team |

Closest NFL Team: Counties Covered Under NIBRS



Arizona Cardinals	Cincinnati Bengals	Houston Texans	Miami Dolphins	Pittsburgh Steelers
Atlanta Falcons	Cleveland Browns	Indianapolis Colts	Minnesota Vikings	San Francisco 49ers
Baltimore Ravens	Dallas Cowboys	Jacksonville Jaguars	New England Patriots	Seattle Seahawks
Buffalo Bills	Denver Broncos	Kansas City Chiefs	New Orleans Saints	Tampa Bay Buccaneers
Carolina Panthers	Detroit Lions	Las Vegas Raiders	New York Giants	Tennessee Titans
Chicago Bears	Green Bay Packers	Los Angeles Rams	Philadelphia Eagles	Washington Football Team

Empirical Strategy

$$\begin{aligned} Y_{isw} = & \beta_1 \text{Exp Win}_{isw} + \beta_2 \text{Exp Loss}_{isw} + \beta_3 \text{Exp Close}_{isw} \\ & + \beta_4 \text{Upset Loss}_{isw} + \beta_5 \text{Upset Win}_{isw} + \beta_6 \text{Close Loss}_{isw} \\ & + \alpha_0 \text{Betting}_{isw} \\ & + \alpha_1 \text{Exp Win}_{isw} * \text{Betting}_{isw} + \alpha_2 \text{Exp Loss}_{isw} * \text{Betting}_{isw} \\ & + \alpha_3 \text{Exp Close}_{isw} * \text{Betting}_{isw} + \alpha_4 \text{Upset Loss}_{isw} * \text{Betting}_{isw} \\ & + \alpha_5 \text{Upset Win}_{isw} * \text{Betting}_{isw} + \alpha_6 \text{Close Loss}_{isw} * \text{Betting}_{isw} \\ & + \delta_i + \gamma_s + \phi_w + \rho \text{Holiday}_{sw} + \rho X_{isw} + \varepsilon_{isw} \end{aligned}$$

- Betting_{isw} : Dichotomous variable if **any sports betting is legal**
- SEs clustered around season-by-team-by-state
- Estimates robust to using full DDD

Underlying Assumptions

1. Exogeneity

- Game outcome should be **as good as random**, conditional on point spread

2. No spill-over across states

- Strict regulation = less of a concern
- Estimates will be attenuated/lower bound if violated
- Robustness to simply looking at pre-/post- legalization of treatment states

3. “First Stage” Effect

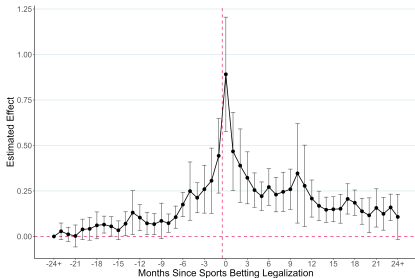
- Actual **changes** in sports gambling **behavior**
- Violated if black market was very large

Reports Backing Up Our First Stage Assumption

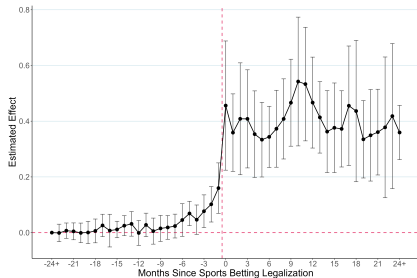
1. AGA (2023) reports ↑ in adults interested in participating in sports gambling by **24 mil (31%)** in the past 5 years
2. AGA (2022) reports **50% higher # of gambler** in states w/ legal sports betting
3. Survey from EY reports significant ↑ **in average amount wagered** after sports betting legalization
4. Calls into National Problem Gambling Helpline ↑ **45%** btwn 2021-2022
5. Humphreys (2021) find's **cannibalism effect** (↓ \$900 mil in rev from video game lottery) from sports gambling legalization

Event Study Analysis: Google Trends Searches

(a) "Sports Betting"



(b) "Sportsbook"



Estimated Effect of Sports Betting Legalization on the Effect of Upset Loss

	(1)	(2)	(3)	(4)	(5)
Upset Loss	0.0263 (0.0202)	0.0298 (0.0198)	0.0289 (0.0199)	0.0303 (0.0198)	0.0342* (0.0197)
Upset Loss*Betting	0.0996* (0.0509)	0.0969* (0.0506)	0.0993* (0.0508)	0.1000* (0.0511)	0.0975* (0.0513)
N	301,854	301,854	301,854	301,854	301,854
Agency FE?	Yes	Yes	Yes	Yes	Yes
Season FE?	No	Yes	Yes	Yes	Yes
Holiday & Week FE?	No	No	Yes	Yes	Yes
Weather Control?	No	No	No	Yes	Yes
Unweighted?	No	No	No	No	Yes

* P-val < 0.1; ** P-val < 0.05; *** P-val < 0.01

Is This Just a Displacement Effect?

	(1) Bar Fights	(2) Other Assaults
Upset Loss	0.0693 (0.0923)	0.0104 (0.0123)
Upset Loss*Betting	0.4122* (0.2448)	-0.0051 (0.0245)
N	135,010	310,079

Heterogeneous Treatment Effects by Mobile v. In-person Betting

Upset Loss	0.0399** (0.0198)
Upset Loss* Mobile Betting	0.1799*** (0.0570)
Upset Loss* In-person Betting	-0.0726 (0.0630)
N	301,854

Heterogeneous Treatment Effects by Market Size

Upset Loss	0.0323 (0.0198)
Upset Loss*Betting*< Median per capita handle	0.0664 (0.0886)
Upset Loss*Betting* \geq Median per capita handle	0.2344*** (0.0828)
N	290,728

Heterogeneous Treatment Effects by Pay Weeks vs. Non-Pay Weeks

	Pay Weeks?	
	Yes	No
Upset Loss	0.0302 (0.0326)	0.0543* (0.0305)
Upset Loss*Bet	0.2397*** (0.0854)	-0.0555 (0.0806)

Heterogeneous Treatment Effects by Previous Team Performance

	Won?		
	No	Last 1	Last 2
Upset Loss	-0.0093 (0.0336)	0.0520** (0.0264)	0.0570* (0.0338)
Upset Loss*Betting	0.1257 (0.0990)	0.1710** (0.0707)	0.2025** (0.0907)

Summary of Our Findings

In the presence of legalized sports betting, estimated effect of upset losses on IPV increases by **10 percentage points**

Heterogeneous treatment effects consistent w/ instances w/ higher amount bet & potential financial loss:

- Legalization of mobile betting (↓ opp. cost)
- Around pay day (expenses ↑)
- Winning teams (recency bias)
- Markets with higher per capita handles (more \$)